

for Snow, one for amount, and the other for depth on the ground.

Unusual Occurrences.—The well-known international symbols were adopted at the Vienna Congress.

Glaciers.—A general recommendation was made to institute measurements of the motion of Glaciers.

Earth Movements.—The statements of Monsieur de Rossi, at Rome, as to what he terms "la météorologie endogène" were received with much interest.

As regards other matters, various combinations of hours for observing were suggested.

The simultaneous observations, proposed at Vienna, by the Chief Signal Office of the United States, were strongly supported.

As regards Weather Telegraphy, an international code for the messages was adopted and various details were settled.

The International Forms for the publication of climatological data (stations of the Second Order) were all arranged and have been very generally adopted.

Among the most lasting and valuable results of these gatherings has been the volume of International Tables, published by Gauthier Villars in 1890.

At several meetings endeavours were made to organise an International Office for directing international work, and this resulted in a proposal for an International Directing Bureau. This scheme, however, failed to secure approval. Various resolutions were framed as to international investigations.

The whole scheme of International Balloon Ascents, superintended by Prof. Hergesell, of Strassburg, took its origin at the Paris Conference of 1896.

The Circumpolar Observations of 1882-3, on the scheme of the late Lieutenant Weyprecht, also took a definite shape at the Roman Congress.

Terrestrial Magnetism.—This subject was first discussed at the Munich Conference in 1891, and at the Paris Conference of 1896 a special committee *ad hoc* was appointed, under the presidency of Sir A. Rucker, and in the report of that conference its action can be seen.

R. H. S.

JOHN HALL GLADSTONE.

THE scientific world has lost an indefatigable worker by the sudden death of Dr. Gladstone, which occurred on Monday, October 6. Few men had a larger circle of friends, for the beauty of his character and the kindness of his nature endeared him to all those who had the good fortune to know him.

Dr. Gladstone was born in London in 1827, and was educated at University College, London, and Giessen University. He was twice married, first, in 1852, to May, daughter of the late Charles Tilt; and secondly, to Margaret, daughter of the late Rev. D. King and niece of Lord Kelvin. So early as 1850 he became lecturer on chemistry at St. Thomas's Hospital, and three years later (in 1853) he was elected a Fellow of the Royal Society. He served on its Council in the years 1863-1864 and again in 1866-1868, and a few years ago received the Davy medal. The Royal Society list of papers credits him with more than a hundred contributions to scientific literature, apart from those in collaboration with other writers. He held the Fullerian professorship of chemistry at the Royal Institution from 1874 to 1877, was first president of the Physical Society from 1874 to 1876, and was president of the Chemical Society from 1877 to 1879.

There can be no question, as an eminent English physicist has recently pointed out, that Dr. Gladstone was "one of the founders of physical chemistry, a fact which is fully recognised abroad, where his rightful position is accorded him." It is, however, only neces-

sary to show how highly his work was appreciated in England to quote the reference to it which was made in 1898, on the occasion of a banquet to past presidents of the Chemical Society who had been Fellows of the Society for half a century, of whom Dr. Gladstone was one Prof. Dewar then said, "Gladstone has worked out his long and brilliant scientific career as a labour of patient love. Furthermore, he has created an entirely new department—that which is in modern times regarded as physical chemistry. For half a century he has worked on this side of chemistry, for his early investigation of the spectrum of the atmosphere was one of marvellous suggestiveness. He found that the spectrum of Fraunhofer varied at sunset and at sunrise from that at midday, and showed that a large number of those absorption-lines must originate in the earth's atmosphere. That discovery stimulated further inquiry as to the substance that could produce these lines so characteristic of the solar atmosphere; and later experimenters have found it in the vapour of water and in oxygen. Gladstone's greatest merit, however, lies undoubtedly in his optical researches on the atomic refractions and dispersions of the elements. He has determined the optical constants of hundreds of bodies, and has thus stimulated inquiry in that borderland between physics and chemistry which is so much cultivated in the present day, and the pursuit of which has added so much to our knowledge. He has also contributed largely to miscellaneous inquiries, especially those connected with various voltaic batteries, and other questions conducive to the study of both organic and inorganic chemistry."

His work was remarkable for its very varied nature. The title of his first paper was "Contributions to the Chemical History of Gun-cotton and Xyloidine," and, true to this early promise, he served as a member on the Gun-cotton Committee of the War Office from 1864 to 1868, having previously served as a member of the Royal Commission on Lights, Buoys and Beacons (1858-1861). Among his less known work, his investigations in connection with early metallurgical history well deserve mention. For instance, he showed that the use of bronze in Egypt went back as far as 3700 B.C., and that not only was bronze used, but that it was of a type common to much later periods, the ratio of copper to tin being as 9 to 1.

It is as an educational reformer that many of Dr. Gladstone's friends will best remember him, for he worked hard for twenty-one years, beginning in 1873, as a member of the London School Board, upon which body he represented the Chelsea division, and was for three years its vice-chairman. He was unwearied in his insistence upon the necessity for teaching science in elementary schools, keeping steadily in view its influence upon the nation as a whole. His attitude may best be gathered from the concluding sentence of his presidential address delivered before the members of the Chemical Section of the British Association in 1872. It ran as follows:—"While the rudiments of science are being infused into our primary education, now happily becoming national, while physical science is gradually gaining a footing in our secondary and our large public schools, and while it is winning for itself an honoured place at our universities, it is to be hoped that many new investigators will arise and that British chemists will not fall behind in the upward march of discovery, but will continue hand in hand with their continental brethren, thus to serve their own and future generations."

The prevailing ignorance of science and scientific methods is constantly rebuked by modern educational writers, but a sentence such as the following, which also occurs in Gladstone's presidential address in 1872, was unusually plain speaking for twenty years ago. He says "the so-called educated classes in England are not only supremely ignorant of science, they have scarcely

yet arrived at the first stage of improvement—the knowledge of their own ignorance."

Among the glowing tributes to Gladstone's memory which have been offered since his death, none are more significant than the following words from one who is singularly well qualified to form an opinion as to the value of his educational work. "It is twenty years," the writer says, "since I first made his acquaintance as a co-worker on my election to the London School Board, and the respect which I felt at first for his activity and devotion in the cause of London education soon ripened into a real personal affection and warm admiration for his unselfish and kindly nature and for his insight into the needs of children intended for industrial life. He was almost the first to see that elementary education must be widened to include the training of all the faculties if it is to be effective, and he did more than any to bring this knowledge to a practical result. It would be well for the country if more men existed of the same noble character."

He has left many witnesses to his power of influencing young scientific workers, to many of whom his memory will be very precious, for but few men have been so faithful throughout a long life to high ideals, and have at the same time so effectively promoted the welfare of humanity.

W. C. R. A.

NOTES.

THE subject of the address of the retiring president (Dr. E. W. Hobson, F.R.S.) of the London Mathematical Society at the annual general meeting on Thursday, November 13, at 5.30, will be "The Infinite and the Infinitesimal in Mathematical Analysis." There are few people better qualified than Dr. Hobson, both on the mathematical and the philosophical side, to expound the change of view that has been gradually spreading over the field of advanced pure mathematical thought during the last half-century; and many persons interested in the subject will doubtless take advantage of his explanations who would not have time to make headway with the extensive literature, mainly foreign, to which these modern philosophical developments have given rise. At the same meeting, the triennial De Morgan medal will be presented to Prof. A. G. Greenhill, F.R.S., for his contributions to mathematical analysis and its application to mechanical problems.

WHILE attempting to navigate the air with a new steerable balloon, M. de Bradsky and his assistant, M. Morin, were killed at Stains, near Paris, on October 13. The balloon was so constructed that the weight of the gas and all its parts was about equal to the weight of air displaced, so that it remained at rest until the propelling screw was started. The screw was driven by a 15 horse-power motor and was behind a steel car, seventeen metres long, suspended by steel wires attached to a light wooden scaffolding. After the balloon had started, it was evident to the spectators that the motor power was insufficient to enable it to be steered. When at an altitude of about one hundred metres, the car broke away from the balloon and was dashed to the ground, causing the death of the two occupants—M. de Bradsky and M. Morin. The disaster appears to have been caused either by the fracture of the steel wires by which the car was suspended from the envelope, or by the whole framework slipping away from the balloon.

ON Friday, November 7, Lord Kelvin will reopen the ancient Cloth-hall at Newbury, which has been restored as a memorial to Queen Victoria and will in future be utilised as a local museum and art gallery.

THE committee of the Huxley Memorial at Ealing has had a memorial tablet placed in the Free Library, Walpole Park, and it will be unveiled by the Mayor of Ealing, on behalf of the Borough Council, on October 23 at 4 p.m.

NO. 1720, VOL. 66]

THE annual "Fungus Foray" of the Essex Field Club will be held on Friday and Saturday, October 17 and 18—in the country near North Weald and Foot Hill on the Friday, and on the Saturday in Epping Forest. Botanists desirous of attending should communicate with the hon. secretary, Mr. W. Cole, Buckhurst Hill, Essex.

WE learn from the *Times* that an interesting antiquarian discovery has just been made in the neighbourhood of High Wycombe in connection with the construction of the new main line of the Great Western and Great Central Railway Companies. In the course of excavating a hill an ancient flint mine has been unearthed, together with an interesting specimen of a pick made of the antler of a stag with its points worn smooth. Many of the disintegrated blocks bear the marks made by the picks used by prehistoric workmen.

THE council of the Institution of Civil Engineers has, in addition to the medals and prizes given for communications discussed at the meetings of the Institution in the last session, made the following awards in respect of other papers dealt with in 1901-1902:—A Telford gold medal to Mr. J. Macfarlane Gray; a George Stephenson gold medal to Mr. R. Price-Williams; a Watt gold medal to Dr. W. Bell Dawson; Telford premiums to Mr. W. R. Cooper, Mr. E. M. De Burgh, Dr. George Wilson, Mr. Frank Oswell and Dr. A. W. Brightmore; a Crampton prize to Mr. C. D. H. Braine; the Manby premium to Mr. B. W. Ritson. For students' papers the awards are:—A Miller scholarship (tenable for three years) and the James Forrest medal to Mr. H. F. Lloyd; Miller prizes to Messrs. J. C. Collett, W. H. C. Clay, H. C. M. Austen, A. M. Arter, Robert Bruce, L. F. Wells and W. H. McLean.

PROF. ROBERT WALLACE is preparing for publication the "Reminiscences" of the late Miss E. A. Ormerod, to the preparation of which she devoted the leisure of her later days. The autobiography was not completed, and much additional material of an interesting character must be in existence. Prof. Wallace would be glad to receive such letters from Miss Ormerod as her correspondents may consider of sufficient importance, together with any other information which they think will be of interest to the general public. His address is the University Edinburgh.

THE remarkable successes achieved by the Marconi system in transmitting messages from Cornwall, across the continent, to the *Carlo Alberto*, moored off the coast of Italy, are well known; some further details of the experiments were published in the *Times* of October 14, from the official report upon them. It appears from this report that the magnetic detector, recently described by Mr. Marconi before the Royal Society, proved in every way superior to the coherer. It was much more accurate in its working and required no regulation. Moreover, it was less sensitive to atmospheric disturbances, giving fairly clear signals under conditions which put the coherer *hors de combat*. The experience on board the *Carlo Alberto* also served to confirm the observation that signalling was more difficult during the day than the night, but this only necessitates increasing the power at the transmitting station in order to carry on long-distance work continuously; there seems to be a practical limit to the sensitiveness of the receiver in that it must not be made too easily affected by atmospheric influences.

THE subject of this year's essay competition for the prizes of 10*l.* and 5*l.* annually offered by the Society for the Protection of Birds (3 Hanover Square, W.) is "Birds in the Field and Garden: their Economic Value to Man." The Society's object is to collect facts and opinions respecting the utility of birds as insect and weed destroyers, a matter which has in recent years compelled attention in various parts of the world, but is still